

1971 OPERATING
SUMMARY

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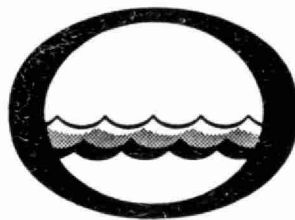
**NEWMARKET/E. GWILLIMBURY
WATER POLLUTION CONTROL PLANT**

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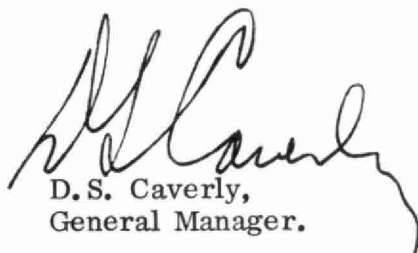


Water management in Ontario


Ontario
Water Resources
Commission

We are pleased to submit for your consideration a summary of operation during 1971 of the water pollution control plant serving your community.

This operating summary contains parameters normally used to measure plant performance and loading, as well as relevant cost data. Because of the concern over eutrophication of our lakes and of the requirement, in many parts of Ontario, to remove the major contributing factor, results of analysis for phosphorus appear in **this** summary.



D.S. Caverly,
General Manager.



D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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NEWMARKET - EAST GWILLIMBURY WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF NEWMARKET

by the

ONTARIO WATER RESOURCES COMMISSION

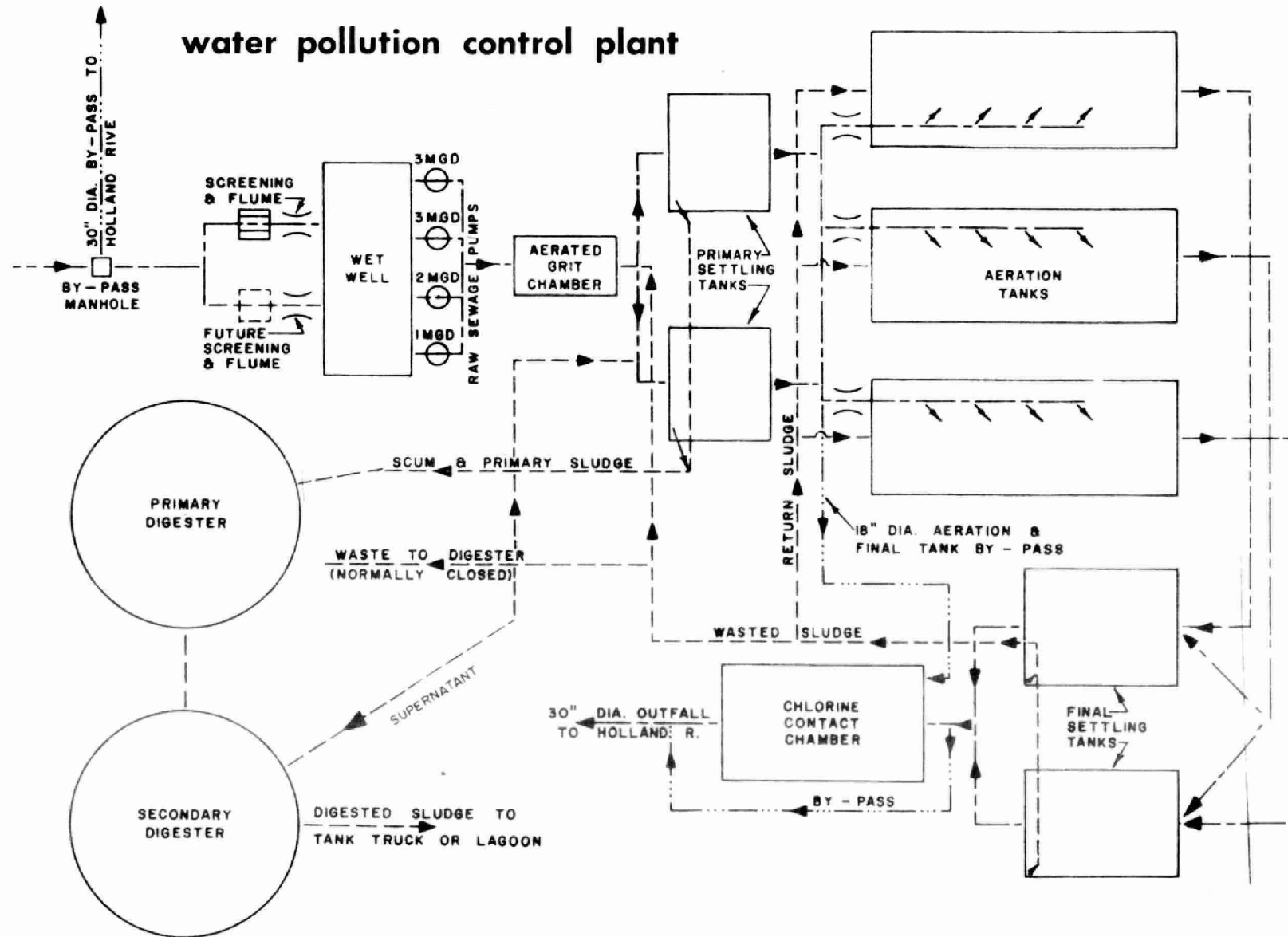
1971 ANNUAL OPERATING SUMMARY

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NEWMARKET-EAST GWILLIMBURY

water pollution control plant



DESIGN DATA

PROJECT NO. 2-0087-61

TREATMENT Activated Sludge

DESIGN FLOW 2.0 mgd

DESIGN POPULATION

Newmarket 9,200

East Gwillimbury 10,000

BOD - Raw Sewage 220 mg/l

- Removal 90%

SS - Raw Sewage 212 mg/l

- Removal 90%

PRIMARY TREATMENT

Screening

in East Channel; 1" spacing

Raw Sewage Pumps

Type: Smart Turner

Size: Two 1875 gpm @ 30' tdh

One 1560 gpm @ 30' tdh

One 1000 gpm @ 30' tdh

Grit Removal

Type: Aerated, grit removed by
air lift

Size: Two 14.3' x 6' x 8.1' swd
(9,700 gal)

Retention: 7 min

Air Supply: One Sutorbilt

130 scfm @ 8 psi

Primary Sedimentation

Type: Eimco

Size: Two 30' x 30' x 11.7' swd
(131,000 gal)

Retention: 1.57 hr

Loading: Surface, 1110 gal/ft²/day
Weir, 10,800 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical; single-pass

Size: Three 90' x 30' x 10.7'
(107,500 cu ft or 0.67 mil gal)

Aerators

Twelve Simcar

Secondary Sedimentation

Type: Eimco

Size: Two 35' x 35' x 13' swd
(197,000 gal)

Retention: 2.4 hr

Loading: Surface, 840 gal/ft²/day
Weir, 7,870 gal/ft/day

CHLORINATION

Wallace & Tiernan

Chlorine Contact Chamber

Size: One 61.4' x 9' x 10.1'
(34,800 gal)

Retention: 25 min

OUTFALL

to Holland River

SLUDGE HANDLING

Digestion System - Two Stage

Primary --

Type: Gas mixed concrete

C. P. Lammert gas comp.

Size: One 40 dia x 21.25 swd

(26,800 cu ft or 0.167 mil gal)

Loading: 2.9 lb/cu ft/mo

Secondary --

Size: One 40; dia x 23' swd

(28,950 cu ft or 0.18 mil gal)

Total Loading: 1.4 lb/cu ft/mo

'71 Review

GENERAL

This project consists of a 2.0 mgd plant with an aerated grit chamber, two primary sedimentation tanks, three single pass aeration tanks, two final sedimentation tanks, a chlorine contact chamber and a two stage digestion system.

Additions to the plant were constructed during the year to provide for lime treatment for phosphate removal. These additions were financed and constructed by the OWRC's Division of Research.

The lime treatment process was studied throughout the year and interim reports indicated that phosphate removal by the addition of lime is feasible at this plant. Continuing studies were in progress at the end of the year to improve the process. A final detailed report is expected in 1972.

EXPENDITURES

The total operating expenditure for the year was \$77,191.97. Payroll, sundry and power costs consumed 44 percent, 27 percent and 15 percent respectively of the total operating costs for 1971. Sundry items also included sludge haulage costs which were \$12,399.30

PLANT FLOWS and CHLORINATION

The plant received 633.79 million gallons of raw sewage during the year. The average daily flow to the plant was 1.74 million gallons, 87 percent of the plant's hydraulic design. The average daily flow increased 8 percent over the previous year.

The maximum daily flow to the plant was 8.0 million gallons while the maximum flow rate to the plant was 9.1 million gallons per day.

The plant effluent was disinfected with 13,090 pounds of chlorine between May and October to provide an 0.5 mg/l residual in the effluent.

PLANT EFFICIENCY

The average influent BOD and suspended solids were 177 mg/l and 333 mg/l respectively. The average effluent BOD and suspended solids were 10 mg/l and 12 mg/l respectively. This represents an average reduction of 94 percent of BOD and 96 percent suspended solids.

A total of 983 cubic feet of grit was removed from the raw sewage during the year. This represents an average of 1.6 cubic feet of grit per million gallons of sewage and is normal.

SLUDGE DIGESTION and DISPOSAL

A total of 3,097,000 gallons of raw sludge was pumped to the digester. From May to December the digester was used as a holding tank due to the addition of lime treatment. A total of 19,914 cubic yards of sludge was hauled by tank truck for land disposal during the year.

CONCLUSIONS

The plant maintained a high degree of efficiency throughout the year.

The introduction of phosphate removal facilities improved the treatment of sewage from the Town.

PROJECT COSTS

2-0087-61	
NET CAPITAL COST (Final)	\$984,794.45
DEDUCT - Portion financed by CMHC/MDLB (Final)	<u>823,620.97</u>
Long Term Debt to OWRC	<u>\$161,173.48</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1971	\$ <u>30,509.44</u>
Net Operating	\$ 54,034.38
Debt Retirement	1,670.00
Reserve	4,079.41
Interest Charged	<u>9,040.36</u>
TOTAL	\$ <u>68,824.15</u>

RESERVE ACCOUNT

Balance @ January 1, 1971	\$ 29,331.93
Deposited by Municipality	4,079.41
Interest Earned	<u>1,995.36</u>
	\$ 35,406.70
Less Expenditures	<u>1,200.00</u>
Balance @ December 31, 1971	\$ <u>34,206.70</u>

PROJECT COSTS

2-0087-61	
NET CAPITAL COST (Final)	\$114,053.15
DEDUCT - Portion financed by CMHC/MDLB (Final)	<u>80,607.51</u>
Long Term Debt to OWRC	\$ <u>33,445.64</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1971	\$ <u>7,244.81</u>
Net Operating	\$ -
Debt Retirement	221.24
Reserve	339.02
Interest Charged	<u>1,876.00</u>
TOTAL	\$ <u>2,436.26</u>

RESERVE ACCOUNT

Balance @ January 1, 1971	\$ 5,312.23
Deposited by Municipality	339.02
Interest Earned	<u>351.55</u>
	\$ 6,002.80
Less Expenditures	<u>-</u>
Balance @ December 31, 1971	\$ <u>6,002.80</u>

PROJECT COSTS

2-0087-61	
NET CAPITAL COST (Final)	\$10,187.75
DEDUCT - Portion financed by CMHC/MDLB (Final)	<u>7,200.24</u>
Long Term Debt to OWRC	\$ <u>2,987.51</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1971	\$ <u>647.14</u>
Net Operating	\$ -
Debt Retirement	19.76
Reserve	30.28
Interest Charged	<u>167.57</u>
TOTAL	\$ <u>217.61</u>

RESERVE ACCOUNT

Balance @ January 1, 1971	\$ 474.51
Deposited by Municipality	30.28
Interest Earned	<u>31.40</u>
	\$ 536.19
Less Expenditures	<u>-</u>
Balance @ December 31, 1971	\$ <u>536.19</u>

PROJECT COSTS

2-0087-61	
NET CAPITAL COST (Final)	\$
DEDUCT - Portion financed by CMHC/MDLB (Final)	
Long Term Debt to OWRC	
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1971	
Net Operating	\$ 23,157.59
Debt Retirement	-
Reserve	1,885.64
Interest Charged	-
TOTAL	\$ <u>25,043.23</u>

RESERVE ACCOUNT

Balance @ January 1, 1971	\$ 12,435.93
Deposited by Municipality	1,885.64
Interest Earned	<u>853.09</u>
	\$ 15,174.66
Less Expenditures	<u>-</u>
Balance @ December 31, 1971	\$ <u>15,174.66</u>

PROJECT COSTS

2-0086-61 NET CAPITAL COST (Final)	\$188,608.82
DEDUCT - Portion financed by CMHC/MDLB (Final)	<u>188,608.82</u>
Long Term Debt to OWRC	\$ <u>Nil</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1971	\$ <u>470.47</u>
Net Operating	\$ 123.25
Debt Retirement	-
Reserve	-
Interest Charged	<u>-</u>
TOTAL	\$ <u>123.25</u>

RESERVE ACCOUNT

Balance @ January 1, 1971	\$ 8,728.18
Deposited by Municipality	-
Interest Earned	<u>576.17</u>
	\$ 9,304.35
Less Expenditures	<u>-</u>
Balance @ December 31, 1971	\$ <u>9,304.35</u>

OPERATING COSTS

• PAYROLL	44 %
• FUEL	2 %
• POWER	15 %
• CHEMICALS	4 %
• GENERAL SUPPLIES	2 %
• EQUIPMENT	< 1 %
• REPAIRS & MAINTENANCE	5 %
• SUNDRY	27 %
• WATER	< 1 %
• TRAVEL	< 1 %

1971 COSTS

TOTAL ANNUAL COST

NET OPERATING	80 %
DEBT RETIREMENT	2 %
RESERVE	7 %
INTEREST	11 %

YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			\$ per million gal	¢ per lb BOD
1967	606.46	\$39,215.29	\$ 64.66	4 cents
1968	531.39	46,889.60	88.24	5 cents
1969	612.10	56,909.54	93.00	5 cents
1970	578.3	61,387.83	106.15	7 cents
1971	633.	77,197.97	121.94	7 cents

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	3848.40	2361.08	-	130.46	1026.73	-	34.00	-	240.03	9.00	30.00	17.10
FEB	6353.70	3503.50	-	379.88	968.55	581.18	65.38	-	37.54	787.67	30.00	-
MAR	7744.50	2437.20	-	125.60	1038.15	-	97.58	37.40	527.01	3391.06	20.00	70.50
APR	4293.44	2384.97	-	141.30	1157.66	-	73.34	-	520.19	905.98	110.00	-
MAY	5283.34	2485.91	247.38	-	1135.81	-	142.39	-	439.96	673.44	80.00	78.45
JUNE	4881.52	2600.63	(247.38)	-	969.13	780.75	122.00	-	11.42	587.22	30.00	27.75
JULY	5820.18	2422.71	-	131.41	1028.82	-	34.00	-	46.37	2102.72	30.00	24.15
AUG	3571.83	2485.59	144.00	-	872.58	-	32.84	-	114.67	9.00	(120.00)	33.15
SEPT	11697.60	2397.04	304.00	-	819.91	832.80	311.14	-	180.37	6823.99	-	28.35
OCT	4999.20	3859.98	-	-	819.91	-	70.07	-	100.64	28.60	120.00	-
NOV	6126.26	3503.14	-	-	811.39	(59.18)	121.55	-	74.66	1628.20	-	46.50
DEC	11572.00	4036.43	-	302.79	766.05	780.75	112.11	121.43	1642.17	3639.12	90.00	81.15
TOTAL	77191.97	34478.18	448.00	1211.44	11414.69	2916.30	1216.40	158.83	3935.03	20586.00	420.00	407.10

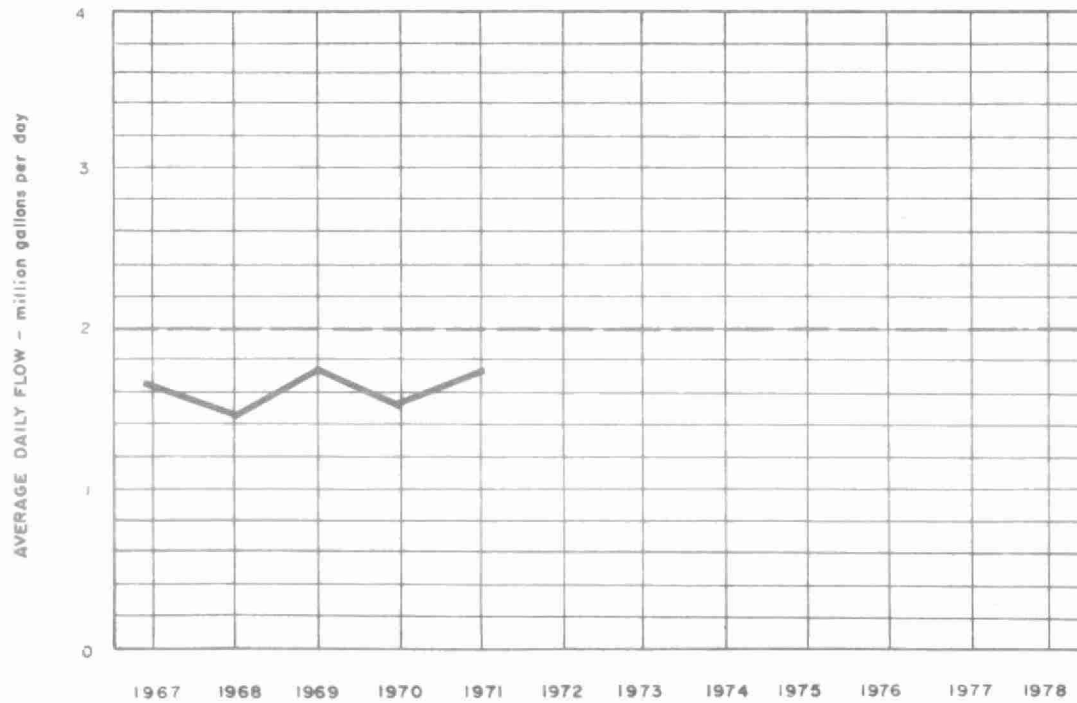
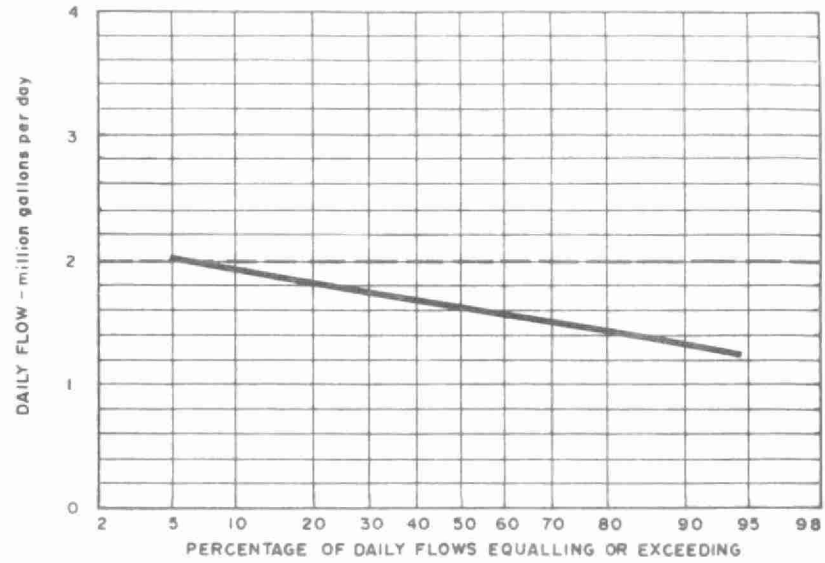
Brackets indicate credit.

* Sundry includes sludge haulage costs of \$12,399.30



PROCESS DATA

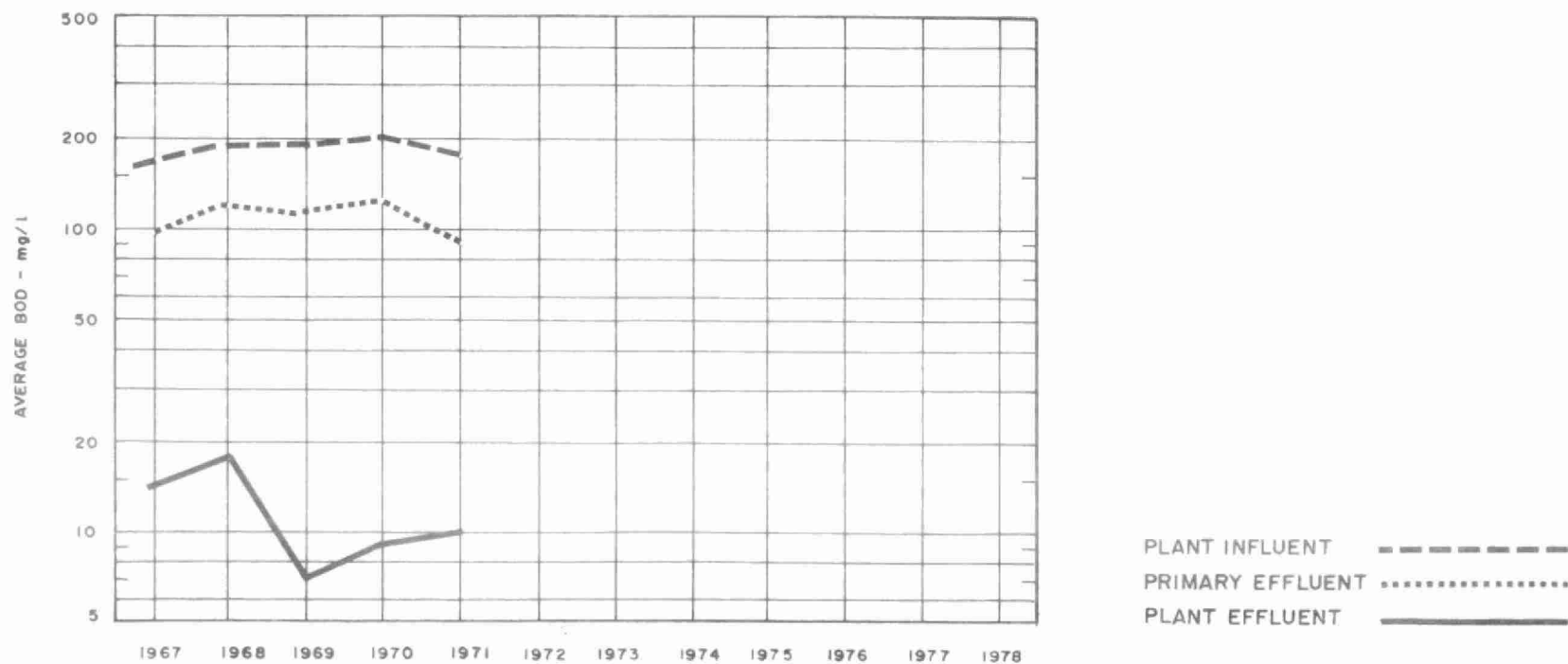
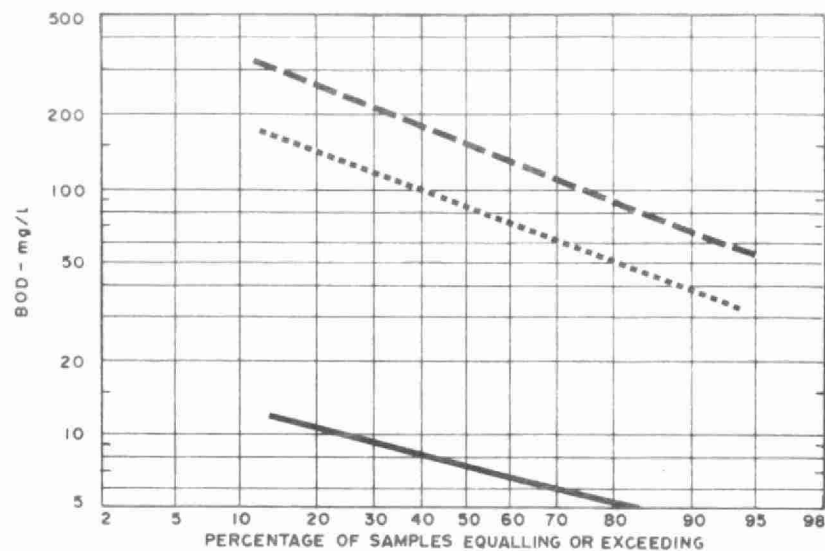
FLOWS



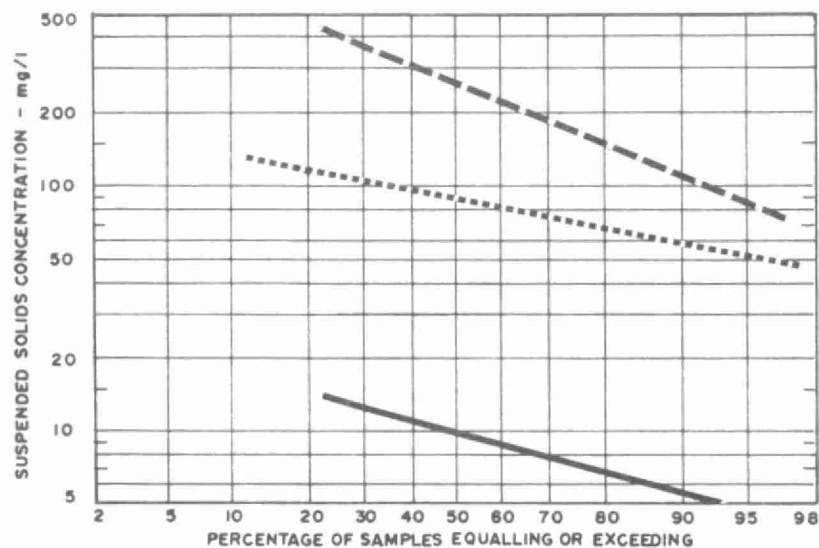
PLANT PERFORMANCE

MONTH	FLOWS				BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				TOTAL PHOSPHORUS		
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	MAXIMUM RATE	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION
	million gallons	mil gal	mil gal	mgd	mg/l	mg/l			mg/l	mg/l			mg/l as P	mg/l as P	%
							%	10 ³ pounds			%	10 ³ pounds			
JAN	50.29	1.62	1.9	2.4	190	14	93	89	250	5	98	123			
FEB	44.26	1.58	3.2	8.0	-	-	-	-	-	-	-	-			
MAR	74.74	2.41	8.0	9.1	125	10	92	96	137	10	93	95			
APR	86.65	2.89	7.7	8.0	109	7	94	88	179	15	92	142			
MAY	51.08	1.64	2.0	2.7	141	7	95	68	251	20	92	118			
JUNE	44.79	1.49	2.0	2.8	234	6	97	102	324	9	97	141			
JULY	44.84	1.45	2.1	4.4	206	6	97	90	413	7	98	182			
AUG	46.60	1.50	2.9	2.9	-	-	-	-	368	12	97	166			
SEPT	43.30	1.44	1.7	3.4	-	-	-	-	308	10	97	129			
OCT	44.28	1.43	1.7	2.7	-	-	-	-	303	7	98	131			
NOV	44.88	1.49	1.9	2.6	295	23	92	122	437	13	97	190			
DEC	58.08	1.87	3.3	8.0	-	-	-	-	495	15	97	279			
TOTAL	633.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG.	-	1.74	MAXIMUM 8.0	MAXIMUM 9.1	177	10	94	93	333	12	96	141			
No. of Samples	-	-	-	-	79	80	-	-	176	178	-	-			-

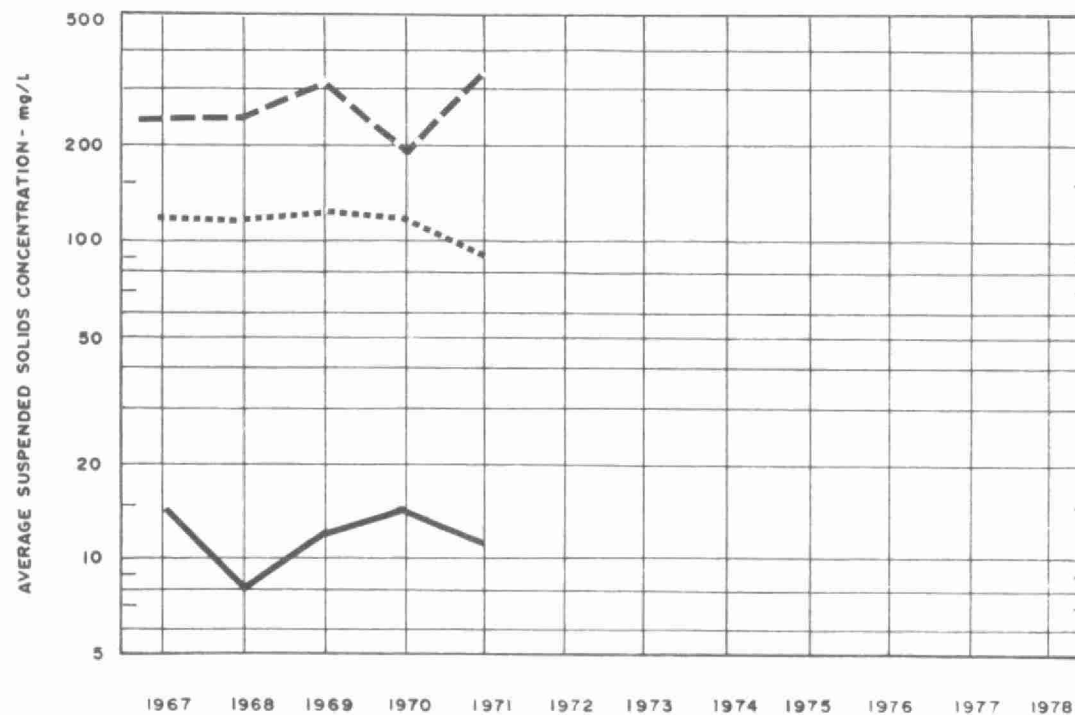
BIOCHEMICAL OXYGEN DEMAND



SUSPENDED SOLIDS



PLANT INFLUENT - - - - -
 PRIMARY EFFLUENT
 PLANT EFFLUENT ———



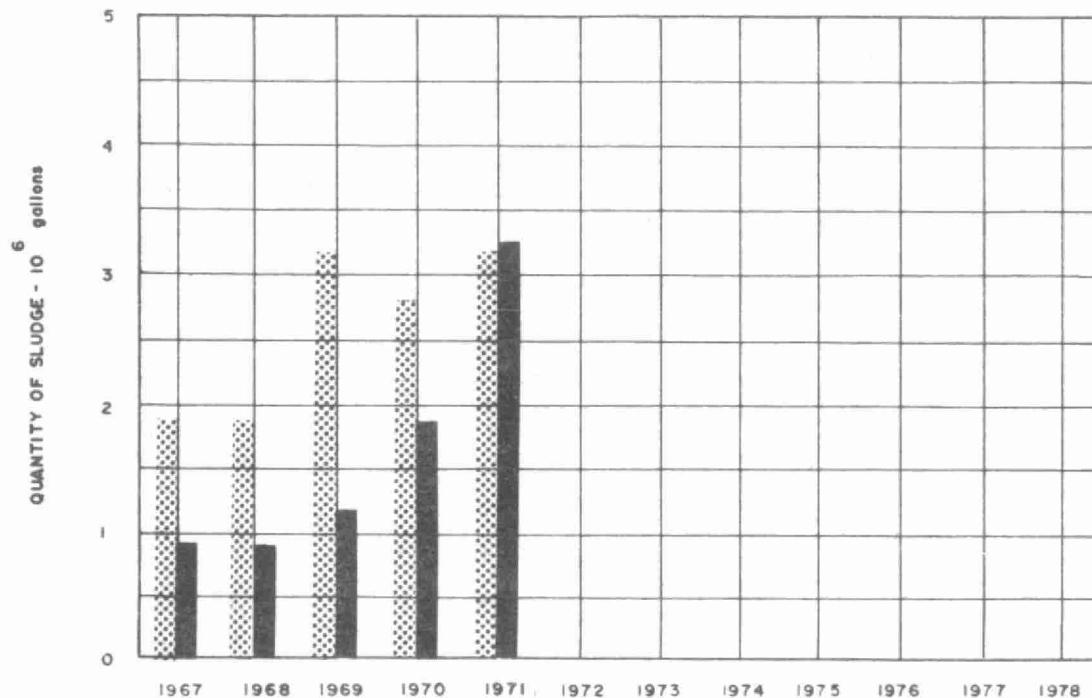
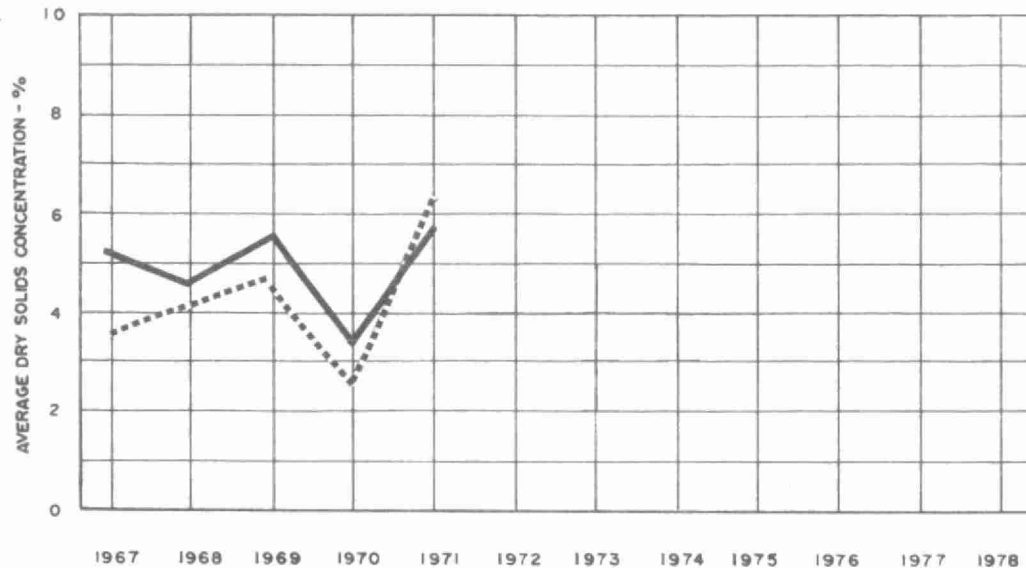
TREATMENT DATA

MONTH	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
	QUANTITY REMOVED cubic feet	CL ₂ USED 10 ³ pounds	AVG. DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day ⁻¹	AIR 1000 ft ³ lb BOD	RAW SLUDGE			DIGESTED SLUDGE			SUPER- NATANT T. S. %	AMOUNT HAULED cubic yards
									QUANTITY 10 ³ gallons	TOTAL SOLIDS %	VOL. SOLIDS %	QUANTITY 10 ³ gallons	TOTAL SOLIDS %	VOL. SOLIDS %		
JAN	56	0	-	55	60	1340	.09	-	217	3.4	69	142	3.3	56	.2	841
FEB	90	0	-	-	-	1750	-	-	214	-	-	103	-	-	-	610
MAR	107	0	-	86	97	2910	.09	-	237	3.4	56	148	5.2	45	.3	935
APR	76	0	-	52	97	2990	.07	-	255	3.2	28	123	9.3	29	.3	728
MAY	106	1.52	4.8	63	119	2370	.06	-	293	9.0	-	96	-	-	-	570
JUNE	76	2.00	5.4	109	106	2460	.10	-	329	5.8	-	358	-	-	-	2127
JULY	74	2.34	5.2	95	94	1940	.14	-	310	8.0	36	412	-	-	-	2447
AUG	91	2.51	5.4	-	106	1550	-	-	302	8.7	40	662	-	-	-	3927
SEPT	75	2.35	5.4	-	93	1700	-	-	233	6.9	-	511	-	-	-	3031
OCT	76	2.37	5.7	-	67	1480	-	-	232	6.3	-	300	-	-	-	1777
NOV	71	0	-	152	71	1350	.38	-	236	6.0	-	143	-	-	-	848
DEC	85	0	-	-	80	1500	-	-	239	-	-	181	-	-	-	1073
TOTAL	983	13.09	-	-	-	-	-	-	3097	-	-	3179	-	-	-	18914
AVG.	1.6 cu. ft/mil gal	2.18	5.3	87	90	1940	.13	-	258	6.2	46	265	5.9	43	.3	1576

Note - Digester used as holding tank from June 16

DIGESTION

RAW SLUDGE
DIGESTED SLUDGE —————



RAW SLUDGE TO DIGESTER
DIGESTED SLUDGE REMOVED —————

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